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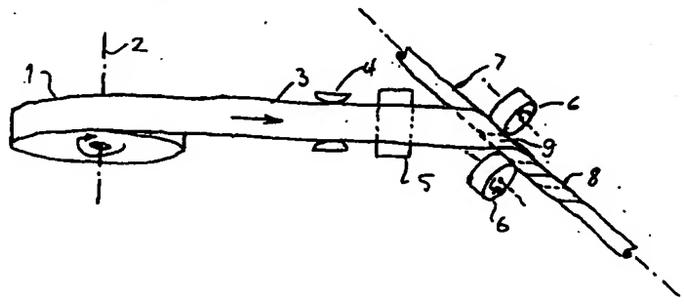
(54) Method and machine for making wound carton tubes, and tubes therefrom

(57) In a method of making a carton tube (8) by winding a carton strip (3) with a layer of glue (not shown) onto a mandrel (7),
the new feature is
that the carton strip (3) has previously been coated with a layer of glue of a kind, that can be changed from an inactive into an active state and vice versa, the glue being in the inactive state until passing through an activating unit (5) situated close to the winding-on point (9) (or even at these points or downstream of it, if thermal activation is used).

By proceeding in this manner, spillage of glue on the equipment used for carrying out the method is avoided, thus reducing the need for supervision.



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Descripti n

TECHNICAL FIELD

The present invention relates to a method of the kind set forth in the preamble of claim 1.

BACKGROUND ART

US-patent specification No. 5,368,671 discloses a method of the kind referred to above. In this known method, strips of sheet material are supplied to a machine, in which a layer of glue is applied to the strips prior to winding the latter about a suitable mandrel.

When making carton tubes in this manner, problems frequently arise due to surplus glue being deposited on machine parts, such as scrapers or guides, eventually preventing the machine from operating properly, unless care is taken to remove glue thus having been deposited. In practice, this means that the operation of the machine, with which the method is carried out, must be under constant or at least frequent supervision by an operator.

DISCLOSURE OF THE INVENTION

It is the object of the present invention to provide a method of the kind referred to above, with which it is possible to make carton tubes or similar articles in a process not requiring constant supervision, and this object is achieved with a method of said kind, according to the present invention exhibiting the features set forth in the characterizing clause of claim 1. By proceeding in this manner, the process of applying the glue to the sheet material can take place outside of the machine used for winding the material into tubular bodies, so that no glue in a condition, in which it can be deposited in an undesired manner on parts of the machine, will be present in the latter. Preferably, the sheet material will be provided with a coat of glue at some central location comprising specialized equipment for applying glue to the sheet material and winding the latter with the glue in a non-tacky state into rolls. These rolls can be stored until required for use in carrying out the method in a plant for making carton tubes or similar articles.

The present invention also relates to

- an accumulation of sheet material for use in carrying out the method, set forth in claims 9 and 10,
- a machine for making carton tubes by carrying out the method, set forth in claim 11, and
- a tubular body being made by carrying out the method, set forth in claim 12.

BRIEF DESCRIPTION OF THE DRAWING

In the following detailed part of the present description, the invention will be explained in more detail with reference to the drawing, in which the principle f the method according to the invention is illustrated using a bare minimum of diagrammatically shown components.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The parts of and accessories to a machine according to the invention shown in the drawing are

- a roll 1 rotatable about
- an axis 2 so as to unwind
- a carton strip 3 passing through
- braking, guiding and/or tensioning means 4, and further through
- an activating unit 5, from which it is helically wound whilst being driven by
- friction rollers 6, in turn driven by suitable means (not shown), about
- a stationary mandrel 7,

thus forming a carton tube 8, such as of the type used to make cores in toilet rolls. It should be noted that the friction rollers 6 are merely shown to symbolize the means for rotating the tube 8 on the mandrel 7. In practice, a belt mechanism will normally be used, providing a greater area of contact with the tube.

The carton strip 3 has previously been coated with a thin layer of glue of the type that can be made to change from a non-tacky to a tacky state, the non-tacky state being the state within the roll 1 and along the strip 3 as far as the activating unit 5. When passing through the activating unit 5, the glue on the strip 3 is changed into the tacky state, in which it remains until having been incorporated in the carton tube 8. From that point, the process of removing the tube 8 from the mandrel 7 continues in any suitable manner.

The roll 1 is manufactured in much the same manner as known tape rolls with a coat of glue in an inactive state, such as dry water-soluble glue, used e.g. for closing and sealing cardboard boxes. This means that a supply of carton strip without glue, e.g. a roll of carton strip as supplied by a manufacturer of such strip, is placed in a suitable unwinding stand or the like, and then pulling the far end of the strip through

- a glue-applying unit, in which a thin layer of glue of the activable type referred to above is applied to the strip, further through
- a glue-inactivating unit - in the case of water-soluble glue simply a drier capable of making the glue non-tacky, to end up in
- a suitable winding stand, in which the strip carrying the dried glue is wound to form a roll like the roll 1 shown.

Clearly, such equipment can be designed and constructed by a skilled person without the need of further guidance.

In the exemplary embodiment shown, the activating unit 5 is placed at some distance from the mandrel 7, but it may just as well be placed close to it, provided - of course - that its activating function is not compromised. Thus, if a dried, water-soluble glue is used on the strip 3, then it may be advantageous to have the activating unit 5 at some distance from the mandrel 7 as shown, so as to give the water being sprayed onto the strip 3 by suitable spray nozzles (not shown) in the activating unit 5 time to penetate into the glue and make it tacky.

In the case of heat-activable glue, the activating unit 5 - in the form of a heat source (not shown) - may be placed closer to the mandrel 7, even some distance downstream from the winding-on point 9, i.e. down and to the right along the mandrel 7.

In the exemplary embodiment shown, the strip 3 is wound helically about the mandrel 7, the latter having a circular cross section allowing it to remain stationary. The scope of the invention does, however, extend to processes differing from the one illustrated. Thus, a strip may be wound in parallel layers on top of each other, either on a round mandrel to form a short cylindrical tube, or on a rotating mandrel having, say, a square, rectangular or other polygonal cross section, so as to form the side walls in a box.

In the exemplary embodiment shown, a single strip 3 coated with glue on one side is used for making the tube 8. The scope of the invention does, however, extend to processes based on two or more strips, of which one or more may not have a coat of glue, whereas one or more may have such a coat on both sides, so that the strips are made to interleave in a suitable manner for forming e.g. a tube.

LIST OF PARTS

1	roll
2	axis
3	carton strip
4	braking/guiding/tensioning means
5	activating unit
6	friction rollers
7	mandrel
8	carton tube
9	winding-on point

Claims

1. Method of making carton tubes consisting of at least two layers of sheet material held together by glue, said method being of the kind comprising the following steps a and b:

   a) providing a mandrel with external dimensions corresponding to the internal dimensions of the tube to be made, and
   b) advancing a supply of sheet material bearing a coat of glue towards and nto said mandrel so as to wind said sheet material on it in a manner causing said glue to make the layers of sheet material adhere to themselves and/or to one another so as to form a rigid tubular body, characterized by
   c) for said coat of glue using a coat of glue of the kind that is normally not tacky but can be made tacky by an activating step, and
   d) that said activating step is carried out prior to or in conjunction with the winding of said sheet material on said mandrel.

2. Method according to claim 1 and comprising the use of braking, guiding and/or tensioning means in contact with said sheet material and guiding same towards said mandrel, characterized in that said activating step is carried out at a position between said braking, guiding and/or tensioning means and said mandrel.

3. Method according to claim 1 or 2 and comprising the making of accumulations of said sheet material and subsequently using said accumulations for supplying said sheet material being used in the method, characterized in that said accumulations are made by accumulating sheet material having been provided with a coat of glue of said kind.

4. Method according to claim 3, characterized by making and using said accumulations in the form of rolls of said sheet material.

5. Method according to any one or any of the claims 1-4, characterized by using a coat of glue capable of being made tacky by the application of a solvent, and using such a solvent for carrying out said activating step.

6. Method according to claim 5, characterized by using a coat of glue capable of being made tacky by the application of water, and using water for carrying out said activating step.

7. Method according to claim 5 or 6, characterized by spraying said solvent or water, respectively, onto said coat of glue.

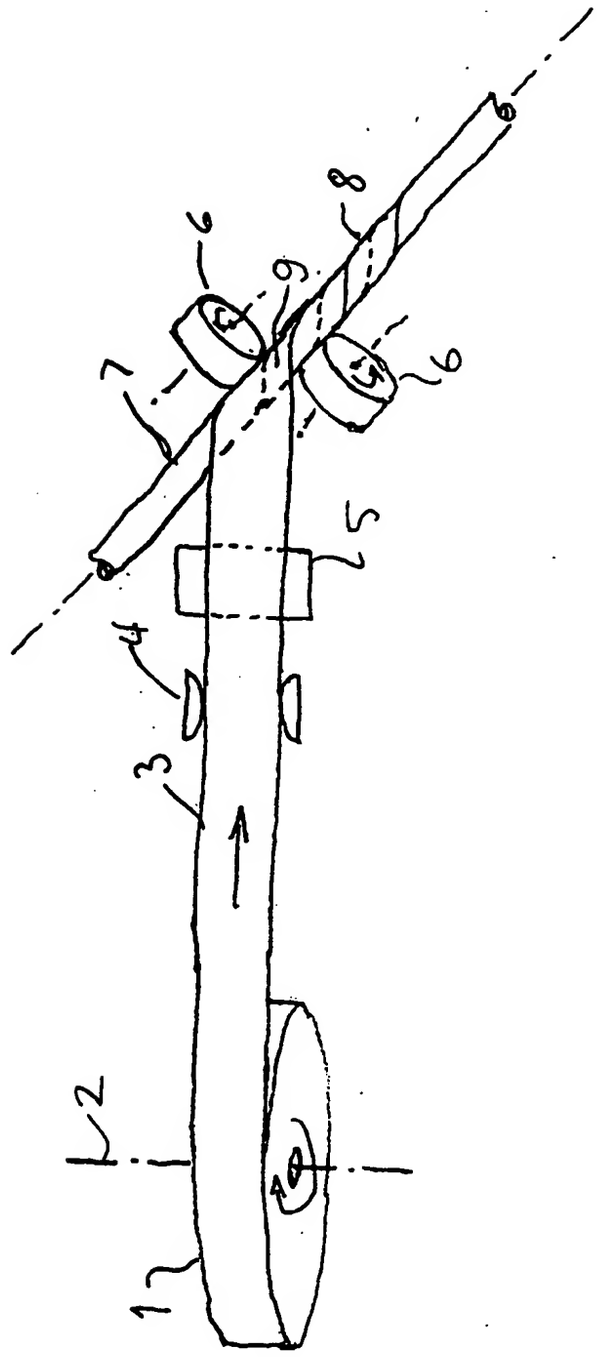
8. Method according to any one or any of the claims 1-4, characterized by using a coat of glue capable of being made tacky by the application of heat or electromagnetic radiation, and applying heat or electromagnetic radiation, respectively, for carrying out said activating step.

9. Accumulation of sheet material for use in carrying out the method according to any one or any of the claims 1-8, characterized by a coat of glue capable of being made tacky by an activating step.

10. Accumulation of sheet material according to claim 9, characterized in that it constitutes a wound roll of said sheet material.

11. Machine for making carton tubes by carrying out the method according to any one or any of the claims 1-8, said machine comprising a mandrel (6) for winding sheet material (3) so as to form a rigid tubular body (7), characterized by activating means (5) adjacent said mandrel (6) for carrying out said activating step by subjecting said sheet material (3) to a spray of solvent or water or to heat or electromagnetic radiation, respectively, according to the type of coat of glue having been applied to said sheet material.

12. Tubular body made by winding sheet material having a coat of glue so as to form a solid body consisting of layers of said sheet material held together by said coat of glue, characterized by being made by carrying out the method according to any one or any of the claims 1-8.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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 0702

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE 91 07 254 U (MAUSER-WERKE GMBH) 14 August 1991 * page 14-2, paragraph 3 - page 3, paragraph 1 * * page 4, paragraph 2 - paragraph 3 * * figures 1-3 *	1-12	B31C3/00 B31C11/04
X	FR 1 301 954 A (ANCIENS ÉTABLISSEMENTS A.H. MONNERET FRERES) 24 August 1962 * page 1, last paragraph - page 2, paragraph 3 *	1,3,4, 8-12	
X	US 3 524 779 A (MASTERS JOHN EDMUND ET AL) 18 August 1970 * abstract; figures * * column 4, line 7 - line 14 * * column 5, line 12 - line 17 *	1,3,4, 8-12	
X	DD 289 971 A (VEB FORSCHUNGSZENTRUM VERPACKUNG) 16 May 1991 * the whole document *	1,5,6	
A	US 4 105 824 A (MONTE ROBERT W) 8 August 1978 * abstract * * column 2, line 41 - line 53 *	5-7	TECHNICAL FIELDS SEARCHED (Int.Cl.6) B31C B31F
A	US 3 839 122 A (CURRENT J ET AL) 1 October 1974 * abstract * * column 3, line 21 - column 4, line 21 *	5-7	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 November 1997	Lanaspeze, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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